

# **SECTION 7**

## **UTILITY INSTALLATIONS, RELOCATIONS AND ADJUSTMENTS**

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## **SECTION 7**

### **UTILITY INSTALLATIONS, RELOCATIONS AND ADJUSTMENTS**

#### **7.1 INTRODUCTION**

Established herein are the general guidelines of the Authority's policy and procedures to be followed when the relocation of existing utilities is required due to Authority construction projects.

Utilities are defined as all public, private and Authority owned facilities constructed for the purpose of conveying, transporting (by other than vehicular means) or transmitting passengers, energy, wastes, products or communications between the source or origin and the point of purchase, receipt, discharge or destination. These utilities include railroads, facilities for water, gas, electric, telephone, cable communications, and fire alarm services, and facilities for sanitary sewage, storm drainage (other than Authority owned) and industrial product transmission. Specifically excluded from this definition of utilities are Authority lighting circuits beyond the load center, utilities inside an Authority's building lines, and E-ZPass Fiber Optic Communications facilities in toll lanes and between toll lanes and the associated toll plaza utility building.

#### **7.2 UTILITY ORIENTATION AND CONSTRUCTION POLICY**

##### **7.2.1 Utility Alignment**

Utility facilities, underground or overhead, within the Authority's right of way, other than those owned, operated or used by the Authority will not be allowed to be oriented parallel or diagonal to the Authority's right of way without the advance approval of the Authority's Engineering Department.

Right-angle utility crossings of the Authority's right of way will normally be considered by the Authority when the services offered by the utility cannot be provided by economically feasible alternate means.

In accordance with the provisions of the Authority's hurricane preparedness plan, consideration must be given to the elimination of aerial facilities crossing over Authority roadways and ramps to preserve the integrity of roadway operations. The Authority's first preference for relocation of existing aerial crossings is to relocate the utility underground. If that is not feasible, aerial crossings may be relocated within underdeck conduits on bridges carrying local roads over Authority roads with Authority approval. If neither underground or underdeck installation is feasible, aerial crossings shall be supported on structures consisting of steel construction located outside of the Authority's right of way. Aerial crossings of Authority roadways shall be located as far away from overhead structures (local roadway bridges, sign structures, etc.) as feasible to avoid potential conflict with future reconstruction. The use of non-steel supports for aerial crossings will be considered for approval by the Authority on a case by case basis. If and when it is necessary to reduce span lengths across excessively wide sections of roadway, the use of additional supports within the Authority's right of way will

also be considered on a case by case basis. The utility owner shall be responsible for substantiating non-compliance with the above relocation preferences, to the Authority's satisfaction, in all cases to be considered for approval.

OSHA and High Proximity Act regulations and One-Call requirements shall be met.

High voltage transmission crossings shall provide minimum vertical clearance as per the requirements of the individual utility owner, but in no case is the vertical clearance to be less than 30 feet over roadways and shoulders. Minimum clearances (both vertical and lateral) for communication lines and overhead power lines of any voltage shall in no case be less than the standards prescribed by the National Electric Safety Code (NESC). The Engineer shall provide the Authority with documentation for the clearance and the concurrence of the utility owner in each case. Structures carrying Authority roadways over or under Authority ramps shall not be used to support utilities, other than those required for Authority purposes.

Pipelines conveying gas at greater than 60 psi design pressure will not be permitted to cross over Authority roadways. Pipelines conveying gas at design pressure of 60 psi or less will be permitted to cross over Authority roadways provided they are sleeved within a casing pipe. No pipes carrying liquids ("wet lines"), other than bridge drainage piping, will be allowed in or on structures over Authority roadways. All underground pipelines operating under pressure shall be cased or otherwise protected under Authority roadways and ramps. On a case by case basis, the Authority may waive the casing pipe requirements under roadways and ramps as noted in Appendix A.

Conduits with power or communications lines crossing under or bridging over Authority roadways typically do not require casing. On a case by case basis, the Authority may require casing or other protection of these conduit installations. All underground casings shall be installed in accordance with the provisions of Appendix A.

Existing utilities will be permitted to be relocated onto a new structure over Authority roadways if the existing structure carrying the utilities is to be removed / replaced. New utilities will be permitted to be carried by structures carrying local roads over Authority roadways only if the utility company has determined to the Authority's satisfaction and approval that installing the utilities underground is not feasible.

Gravity flow pipelines need not be cased under Authority roadways, provided that no erosive, corrosive or caustic conditions or stability problems exist which would predictably limit the life of the pipe. Under doubtful circumstances, such pipelines should be sleeved within a casing pipe or concrete encased, whichever is more economical and appropriate. Future enlargement of the cased gravity flow pipeline should be considered when determining the size of the casing pipe.

Casings are not required for pipelines of any type passing under paved public parking lots at Authority service areas, toll buildings, and maintenance facilities.

All utility crossings shall be arranged such that required points of access, such as manholes and poles, are outside the Authority's right of way. This policy may be modified with specific Authority approval where unusual conditions make such arrangements unrealistic.

Criteria for railroad and other such major utility alignments shall be established for each specific case by the Authority's Engineering Department, except for clearances and other geometric requirements which are set forth under Sections 1A and 1B (Geometric Design) of the Design Manual.

### **7.2.2 Construction Methods**

When an Authority construction project requires relocation of an existing utility crossing, the Authority's preference is to construct the necessary relocation as a part of the roadway contract. For utility owners that agree to this arrangement, the Authority's Engineer shall prepare the necessary plans and specifications for the work, in cooperation with the utility company, and incorporate the work in the principal contract. Specific written approval of the plans and specifications is required from the utility owner, prior to advertising. If the utility owner insists on performing the required utility relocation work themselves, the utility owner's plans are to be included in the Authority's contract documents as reference material for work "by others".

With the Authority's Engineering Department approval, the utility company may furnish all or part of the necessary construction materials for the utility relocation to be installed by the Authority's contractor (or subcontractor approved by the utility owner, as required by the owner). This is provided that such procedure will significantly expedite construction and/or result in cost savings and that the utility company shall ensure timely delivery. In such cases, the Engineer shall include a list and delivery schedule of the materials to be supplied in the contract documents as well as in the Utility Check List. The contract documents and the Utility Check List shall also indicate that it is the utility owner's responsibility to review and approve the contractor's material submissions as needed.

The Authority may consider authorizing the utility owner to order materials in advance of the formal execution of the Utility Order when Authority construction schedules and potential materials delivery delays make it mandatory to do so. No such orders shall be placed without specific written authorization by the Authority's Engineering Department.

The Engineer and the utility owner shall design for construction sequencing and maintenance and protection of traffic as necessary.

### **7.2.3 Materials**

Casing pipe material and size shall conform to the requirements of Appendix A for the applicable installation method used.

When steel pipe casings are used, sacrificial anodes and a corrosion-resistant coating will be required, if resistivity readings indicate. Sacrificial anodes shall be installed with accessible test leads to allow periodic voltage readings to be made which will determine when anodes require replacement. The Utility Order shall include a clause under which the utility owner agrees to replace degenerated anodes as a requirement of their routine maintenance procedure.

Pipeline casing diameters shall be chosen to accommodate the carrier pipe and standoffs as well as any potential future expansion of the carrier pipe in accordance with Appendix A.

Casings, pipelines or ducts installed in open cut within the Authority's right of way shall be constructed using excavation and backfilling methods conforming to Authority specification requirements for underground pipelines.

Buried Carrier Pipelines shall be steel, ductile iron, concrete pipe, or high-density polyethylene (HDPE) at the utility owner's option and after due consideration of the chemical characteristics of the soil at each site. The Authority's Engineering Department concurrence with the pipe material selected is required.

Carrier pipelines on structures shall be steel pipe. All supporting hangers and pipe shall conform to the Authority's standard specifications (or to utility company's standard practices, whichever is more stringent). All such pipelines shall be located to the interior of fascia stringers and shall not hang below the bottom flanges of stringers or girders, preferably 6 inches above the bottom flange for future catch systems. Utility supports shall generally be attached to the superstructure steel.

Utility owners normally require steel pipelines on structures to be paint-coated. Along the Turnpike, the Authority requires such pipelines to be fabricated from ASTM A-588 steel and be unpainted or coated in a permanent and maintenance-free manner. However, utility owner policy has not, in the past, permitted this alternative. On structures with ASTM A-588 (unpainted steel) superstructures, such pipelines may be the only painted items. Accordingly, the Engineer shall anticipate this condition when such work is included in Authority contracts. All pipeline painting shall be performed off the structure and before installation, except touch-up at the joints. Along the Garden State Parkway, painting of steel pipelines on structures shall conform to the current painting specifications.

Electric and telephone duct and cable installations shall generally conform to the respective utility company's practice with regard to materials and structural design (latest company standards should be checked). This design shall be modified for adequacy and form. Utility company owned underground ducts within the Authority's right of way may require concrete encasement or casing pipe, if requested by either the Authority or the utility owner on a case by case basis.

Authority owned communications, telephone and electrical ducts and cable shall conform to materials and construction requirements established under

Section 7 (Lighting and Power Distribution Systems) and Section 8 (ITS and Communications Systems) of the Design Manual.

#### **7.2.4 Easements and Access**

If Authority improvements require relocation of utilities outside of existing right of way, the Authority may acquire right of way or easements to relocate such utilities; however, that is to be determined on a case by case basis. Generally such easements would be of a width equal to adjacent existing easements or of a width adequate for common maintenance access, if no existing easements are established. This applies to utilities which will cross perpendicular or run parallel to the Authority's right of way but not in public road right of way, Authority property or a previously established utility easement. This also applies to projects with local road improvements which require utility relocations along or crossing local roads.

If the approved utility relocation alignment is such that ingress or egress through the Authority's right of way is required for routine maintenance, such access will be allowed, subject to the terms established by the Authority and as described in the Authority's License to Cross. The Authority's website contains additional information.

***The Authority has extensive Utility Installation Permits (former New Jersey Highway Authority) and Licenses to Cross for utilities within its right-of-way. The consultant is to request the agreements within the project limits and proceed with the terms established in the agreements regarding facility relocation, should they exist. These documents are available through the Engineering Department Design Liaison.***

#### **7.2.5 Costs and Betterments**

When expansion of existing Authority facilities requires the relocation of utilities previously affected by the original Authority facility, all Authority policies with regard to financial participation are subject to the terms of any crossing license or occupancy agreement issued for the original installation. The Authority prefers to include utility relocations in its contracts, therefore, for utility relocations which are to be paid for by the utility owner as required by a previously issued crossing license or occupancy agreement, the Engineer shall obtain an authorizing letter from the utility owner to allow the Authority to include the utility relocations in its contract and to reimburse the Authority for the costs.

All cost participating arrangements shall be set forth in detail in the Utility Order covering the work, or by other written authorization initiated by the Authority. No reimbursement by the Authority will be made for utility owner costs or expenses not specifically and formally authorized.

The Authority will reimburse the utility owner for authorized costs following the approval of billing. The final billing must be submitted to the Authority's representative, the Resident Engineer, within 90 days after completion of the work and no billings will be accepted beyond 120 days after the completion of the work. The Resident Engineer must approve and sign invoices before forwarding to the Authority.

No reimbursement for utility owner expenditures in excess of the amount authorized will be made by the Authority without a duly executed Supplemental Utility Order specifically justifying the need for additional expenditures. This supplemental authorization is to be made prior to the expenditure of additional monies and must include all additional monies necessary to complete all work.

If the Authority agrees to relocate a utility for an owner at Authority expense, the Authority will bear the cost of such work directly. The cost of any utility relocation work done under an Authority contract, which is determined to be a betterment by the Authority, shall be reimbursed to the Authority by the utility owner to pay the cost of the betterment.

Betterments are defined as those costs for utility relocation construction which result in increased function, capacity or the potential therefore, and/or increased value of the relocated system over that previously in existence in the system which are being replaced. Exceptions to this definition are as follows:

1. If the utility owner has formally adopted minimum utility size criteria which he routinely used to replace-in-kind small existing sizes in his own work, such substitution on Authority projects will not be considered, of itself, a betterment.
2. If the utility owner has formally adopted the use of a new material which he routinely uses to replace-in-kind existing materials in his own work, such substitution on Authority projects will not be considered, of itself, a betterment.
3. Pipeline casings which are required by the Authority for its own interest to be larger than would otherwise be required will not, in themselves, be considered betterments.

Betterment cost allocation procedures are covered under Subsection 7.2.8.3.

#### **7.2.6 Relocation of Authority Owned Utilities**

The Authority owns and maintains various sanitary sewer, water, power and communications systems connecting Authority facilities to facilities owned and maintained by various utility companies and communications carriers.

Buried conduit facilities support the Authority's voice, video, and data communications via buried fiber optic communications backbone and lateral cable/conduit to interconnect components of the Authority's network throughout both roadways.

Telephone and electrical service connections to Authority owned facilities are normally constructed, owned, and maintained by the utility company. Any underground ducting and manholes for such services within Authority right of way are constructed, owned, and maintained by the Authority.

The Authority owns right-of-way, conduit and fiber optic cable as part of the E-Z Pass system and communications network which consists of a backbone system along both the Parkway and Turnpike roadways, as well as laterals

from the backbone to various Authority-owned facilities. The conduit and cable may be maintained by the Authority or an outside utility agency. Relocations and protection of facilities which are not maintained by the Authority are subject to a Utility Order.

The Authority also owns and maintains other conduits and ducts along the Parkway roadway generally known as the PTAT System, which is located along the northbound Parkway lanes between Milepost 36 and Milepost 128. The Authority leases some of these conduits and ducts to telecommunication companies which install, own and maintain cable. Relocations of affected facilities shall be arranged with the lease designated utility owner by the Engineer as a negotiated "No Cost" Utility Order.

Within roadway toll plazas and other Authority-owned facilities, all power, communication, sanitary sewer, water, and other utility services are provided and maintained by outside utility companies. New installations, relocations, and protection of these facilities do not require a Utility Order, however, the Engineer shall be responsible for coordinating such work with the utility owner. The design requirements for the Engineer are outlined in Section 11 (Facility Buildings/Toll Plazas) of the Design Manual.

All Authority contracts in the area of existing Authority-owned utilities shall include provisions for the relocation or protection of these utilities as required by the work. Mark-outs and phone call notification may be required as determined by the contract.

Relocations of affected existing telephone and electric services shall be arranged with the utility owner by the Authority's Engineer. Necessary duct and manhole construction shall be included in an Authority construction contract. The procedures for arranging the relocation of existing services are the same as those for establishing new services and are set forth under Subsection 7.2.8.

The Authority leases several locations along both roadways to cell tower operators. Special consideration is to be taken by the Engineer when working with utilities in and around these sites to ensure that the terms and conditions of the cell tower lease holder agreements are not violated.

### **7.2.7 Provision for New Authority Owned Utilities**

All Authority contracts shall provide for any necessary new construction of Authority owned utilities. All arrangements for these services and also for utility owned services shall be made by the Engineer, subject to the review of the Authority.

Procedures in this regard are set forth under Subsection 7.2.8.

### **7.2.8 Administrative Procedures**

#### **7.2.8.1 Authorizing Documents, Content and Procedures**

The Utility Order is the formal document through which the Authority and utility owner agree to the terms under which utility relocations, ordering of materials and/or inspection are to be



performed. This document consists of the order proper and associated schedules and exhibits which are appended to the Utility Order. The Authority's website contains additional information.

The schedules and exhibits set forth the complete details of the work and the costs.

Schedules include the utility owner's estimates of the cost of the work, betterment computations and other necessary tabulations. Exhibits are the associated plans illustrating the work and correspondence outlining details and special considerations related to the work. As a minimum, there shall be one schedule which is the utility owner's cost and construction time estimate and two exhibits which are Exhibit A, Utility Check List and Exhibit B, the Scheme of Accommodation with an inset vicinity map. The Authority's website contains additional information.

The Scheme of Accommodation shall consist of a plan(s) at a suitable scale and sheet size that minimizes the number of plans yet clearly depicts the existing utilities and the utility relocations with all designations, sizes and types of material, existing and proposed, clearly labeled. Any associated right of way requirements shall be depicted. The Authority prefers 8.5" x 11" or 11" x 17" sheet size, if feasible. The color legend shall be:

- red – existing facilities to be removed or abandoned
- green – proposed relocated facilities
- yellow – temporary facilities
- blue – betterment facilities

Color does not have to be provided, if other means such as line style, symbols, callouts and/or shading clearly convey the scheme. The work shall be numbered in the order in which it is to be performed. The same numbers shall appear in the Check List. Critical cross sections of proposed utilities may be necessary to confirm horizontal and vertical clearances.

Other exhibits may include the utility owner's plans on which the estimate was based. All schedules and exhibits shall be labeled alphabetically (SCHEDULE A, B, C, EXHIBIT A, B, C), folded as necessary and appended to the Utility Order. The upper right corner of each page of each attachment shall have the schedule or exhibit designation, the Utility Order number, and the page number of that attachment except for plans, which shall have that information above the title box. The Authority's website contains additional information.

The Utility Order cost, which is entered on the first page of the order proper, represents the maximum cost the Authority will pay for the work included in the Order. Where betterments are a part of the work, this figure represents the total cost of the work less the cost of betterments.

Separate Utility Orders are required for each utility owner affected by any one construction contract. Where several independent relocations of the utilities of any one owner in any one contract are widely separated geographically within a construction contract or are separated in time because of construction sequences, separate Utility Orders covering each area or each phase of the work may be prepared.

Where utility relocations require close coordination with the Authority's contractor, construction access on the Authority's right of way, or where unusual cost participation concepts are present, all aspects of these considerations shall be spelled out in detail through written correspondence until concurrence on all points is obtained. All such pertinent correspondence shall be included as an exhibit in the Utility Order. The Engineer shall include the details of coordination in the Construction Contract.

Utility Orders are not required for utility relocations to be performed under an Authority construction contract. However, any Authority reimbursement for inspection by the utility owner of the Authority's work in relocating the utilities must be authorized by a Utility Order. In this case, the schedule sets forth hourly inspection rates and the total estimated inspection cost, and the check list and scheme show the work to be performed under an Authority construction contract.

Authorizing letters from the utility owner approving the Authority's plans and specifications for relocation work to be included in the Authority construction contract, and agreeing to pay for any resulting betterments, are required by the Authority prior to advertisement of the construction contract.

The Engineer's procedure in preparing Utility Orders is as follows:

- a. Early in the preliminary design studies, contact and preferably meet with all utility owners within the project area. The Authority's website contains additional information regarding the initial contact letter.

Furnish the utility companies with a 1"=100' or 1"=200' scale map, with or without alignment, and request the utility companies to show the type, size, material and age of their facility and its approximate location. All municipalities and privately owned utilities in the area must be contacted. During the initial contacts with utility owners, the Engineer shall ascertain the requirements of each utility owner with respect to the type of right of way or easement property descriptions needed. Should metes and bounds descriptions be required, the Engineer shall accordingly arrange for the necessary surveys and descriptions.

In order to assure the Authority that all utilities have been contacted, (public, municipal, private, etc.) the Engineer is to furnish copies of their contact letters and the utility's responses either acknowledging their facility or stating that they have no facilities within the project limits.

The Engineer shall show the proposed project and the approximate locations of existing utilities in plan with conflicts identified.

- b. Early in Phase "A", if there was no Preliminary Design, the Engineer shall make the initial contact as described above. Present information provided by the utility owners on preliminary 1"=30' or 1"=50' scale plans. Supplement and verify the information through field surveys and investigations. Send the plans to the utility owners for verification.

The Engineer shall maintain a Utility Status Schedule to be presented at intervals determined by the Authority project engineer on a project by project basis. The Authority's website contains additional information.

Upon return of the verification plans by the utility owners, update the plans. Show the existing utilities and the proposed project, and identify the utility conflicts for Phase "A". Verify the accuracy of as-built data with test holes as required. Test hole data shall correspond to the project survey baseline control.

- c. Early in Phase "B", the Engineer is to meet with the utility owners and mutually agree upon the most economical relocation scheme which is compatible with the utility owner's policy and the Authority's policy. The selected scheme shall be compared to all considered alternates and justified as the most economical. Provisions for owner access to the utility shall be considered at this time as well.

The selected relocation scheme shall also be considered during preparation of erosion prevention and sediment control plans for review by the local soil conservation district(s) in order to identify potential conflicts with proposed drainage facilities.

The Engineer shall prepare a Check List and the Scheme of Accommodation for each utility owner, and request a preliminary cost estimate including engineering, materials, inspection and construction as applicable. The check lists and schemes should show existing facilities and proposed work, with betterments noted where applicable. The Authority prefers that all costs to be reimbursed to a utility owner be covered under the Utility Order. However, if a utility owner insists on reimbursement of early expenditures such as for engineering or long lead materials before execution of the

Utility Order, the Engineer shall arrange to do so. At this time, the Engineer should obtain an estimate from the utility owner for such costs and issue a Utility Engineering Authorization Order. The Authority's website contains additional information. The Engineer shall reimburse the utility owner invoices as a direct cost in the Engineer's OPS.

The Engineer is to submit the approved Scheme and Check List (including time frames for notification and duration of work) and the owner's preliminary cost estimate for each affected owner to the Authority for approval a minimum of four weeks prior to a Phase "B" submission. This utility submission shall include for each location the details of the existing facility (size, materials, appurtenances, etc.), proposed facility (lengths, materials, sizes, etc.), facilities to be abandoned or removed, betterments and owner participation, and by whom the work is to be performed.

- d. Once the Phase "B" submission is approved, the Engineer shall furnish the utility owner with full-scale plans for the Authority facility, showing the proposed utility relocations and requesting that the utility owner estimate and submit in writing the cost of the relocation and the schedule including ordering of materials, construction durations, and seasonal and time restrictions. At this time the Engineer and utility owner shall determine the availability of materials for the work and make arrangements necessary to obtain critical materials. All long lead equipment and materials need to be identified and considered in the timeline developed for the utility relocation to assure any and all delays are minimized. All betterment concepts shall be resolved to the satisfaction of all parties at this stage. Any utility relocation that is independent of the construction contract that can be performed in advance of the construction contract (without detriment to the project) should be ordered to be completed as soon as possible and the relocated as-built information provided as part of the contract documents. The Engineer and utility owner shall complete the schedule for construction staging of utility relocations.
- e. Upon receipt of the utility owner's estimate, the Engineer shall review the estimate for accuracy and content and forward the accepted estimate to the Authority. The Authority will assign a Utility Order number which will appear on the final Utility Order. The Engineer shall prepare the formal Utility Order and forward three draft copies of the Order, complete with the associated schedules and exhibits, to the Authority. Upon Authority approval, the Engineer shall forward seven final complete copies to the Authority. Utility Orders are to be forwarded to the Authority prior to making a Phase "C" submission. The Engineer shall verify that the Utility Order information is consistent with the utility relocation work in the Phase C plans and specifications.

The Engineer shall include copies of the check lists in an appendix of the supplementary specifications.

The Engineer shall keep the utility owner apprised of the contract plan development at all times by sending him copies of the appropriate drawings from all Phase "B", "C" and "D" submissions.

After Phase "D", the Engineer shall schedule meetings, as appropriate, with all impacted utility owners and the Authority's design and construction representatives to advise of project status and continue coordination.

Additional utility installation submittal requirements related to underground installations are outlined in Appendix A.

2. A Supplemental Utility Order is the formal document through which the Authority and the utility owner agree to the terms under which utility relocation costs, in excess of those covered in the initial Utility Order, will be paid. The Authority's website contains additional information regarding the Supplemental Utility Order.

Supplemental Utility Orders are occasionally required when changes in Authority construction concepts or unforeseeable construction complications increase utility relocation costs beyond those anticipated in the original Utility Order estimate. The circumstances requiring the execution of a Supplemental Utility Order must be thoroughly documented. Unexplained errors and omissions in the original estimate may not be accepted by the Authority as a basis for issuance of a Supplemental Order.

The Engineer shall prepare and justify all Supplemental Orders, and forward same to the Authority.

The Authority shall review the Supplemental Order for form and content. The same procedures and number of copies are to be used as described for Utility Orders.

3. Authorizing Letters

Authorizing letters are used by the Authority to authorize the commitment of Authority funds prior to or in lieu of the execution of the formal Utility Order. Authorizing letters would be required to authorize utility owners to order critical materials in advance of Utility Order execution, or to authorize utility owners to expend funds for engineering studies and estimates for proposed relocations. Upon Authority authorization, the Engineer shall prepare the Utility Engineering Authorization Orders described in 7.2.8.1.c.

Where betterments are included in utility relocation work to be performed under Authority contracts, the Authority will normally accept an authorizing letter from the utility owner accepting responsibility for the betterment cost as sufficient agreement to proceed with the work. Utility owner originated letters to the

Authority are also normally considered adequate to establish the utility owner's intention to provide a portion of the utility materials to be installed under an Authority contract, or to establish the utility owner's concurrence with the Authority's plans to relocate his facilities under an Authority contract.

#### **7.2.8.2 Other Agreements, Permits, and Licenses**

1. A License to Cross (LTC) (formerly referred to as an Occupancy Agreement) is to be entered into by the Authority with any utility company or authority which will have their facilities within the Authority's existing or proposed right of way. In all cases, the License to Cross document is prepared by the Authority's Engineering and Law Departments. When a utility owner has its own project that crosses Authority right of way, the utility owner shall prepare and submit a License to Cross application to the Authority for consideration. The Authority's website contains information on the application process and requirements. For utility installations that will require trenchless installation methods, refer to Appendix A for additional LTC application requirements.
2. Other Agency Permits, if applicable, are those permits for road openings, flight path clearance, stream encroachments, navigation, wetland, treatment works, water distribution, etc. which are necessary to allow the utility owner to relocate his facilities. These permits are normally applied for by the utility owner; however, the Engineer shall closely monitor the utility owner's progress in obtaining the necessary permits and provide such assistance and information as may be required. The last two permits may not be well known. Any work of building, installing, or modifying a sanitary sewer line, pumping station or force main having a flow of more than 8,000 gallons per day within the public ROW or a septic system with flows greater than 2,000 gallons per day requires a Treatment Works Approval from NJDEP as per N.J. A. C. 7:14A. Whenever more than 1500 feet of new main that interconnects with a public water system, or there are more than 6,000 gallons per day of non-residential average demand, a Water Distribution permit is required from NJDEP as per N.J.A.C. 7:10A.

#### **7.2.8.3 Betterment Calculations**

Improvement betterments are the increases in cost which result from the replacement of existing facilities with facilities capable of increased function or service. Such additional costs will not be paid for by the Authority, except as provided in Subsection 7.2.5. Participating costs are the portion of the overall utility relocation cost which the Authority agrees to pay.

Where betterments are recognized, one method is to express participating costs as a percentage of the total utility construction cost, thus establishing the basis for determining the amount the Authority agrees to pay according to the terms set forth in the Utility Order. Another method is to determine the cost of each item of work, and identify those that are subject to betterment percentages. In that these percentages must be established before the contract is

awarded, it must be determined on the basis of past costs for similar work, or on some other fair and equitable basis. Other methods may be considered. The chosen method is subject to Authority approval. In all cases, betterments shall be based on a comparison of installed costs, including materials and labor.

Where the utility owner has sufficient staff and experience to do so, improvement betterments should be computed by the utility owner and checked and verified by the Engineer. Where small municipal or private utilities are involved, the Engineer shall perform such betterment computations as may be beyond the capacity of the utility owner, and shall obtain the concurrence of the utility owner on the results.

The following commentary will clarify betterment conditions and the procedure to follow in determining calculations.

Case 1 - The Authority's contractor placing conduit between abutments, and the utility Company doing work outside the abutment limits for any crossings involving a partial betterment.

Separate betterment calculations will be required for the Authority contractor's billings and the Utility Company's billings.

The Utility Company will only be required to pay that betterment portion of hanger supports, hangers, conduit, cable / pipe and appurtenances.

However, all hanger supports, hangers, conduit, cable / pipe and appurtenances will be placed by the Authority's contractor between abutments, and the Authority will bill the Utility Company on the basis of the betterment percentage computed by the Utility Company. This betterment calculation must be approved by the Authority prior to construction by the Authority's Contractor.

It is not necessary to compute an aggregate betterment percentage for billing purposes. All invoices will be handled with the particular betterment involved in the area being worked. Each invoice under any one particular Utility Order will reflect the various betterment percentages within that order, as the work is completed in the respective areas. Any invoice can contain a certain part of a betterment, various different betterments or no betterment at all, depending on the work done under that particular invoice.

Case 2 - Utility Company doing all work involved in a relocation.

The Utility Company will submit betterment calculations to the Engineer for review and approval as above. All betterments involved within the Utility Order will be combined to form an aggregate betterment percent to be included on all the invoices sent to the Authority.

"Payment for Utility Line Supports on Structures"

For all miscellaneous hardware (U-bolts, neoprene pads, hanger rods, rollers, clamps, washers, nuts, etc.) required for utility conduit installations on structures, the cost of furnishing and installing such hardware is to be included in the linear foot unit price bid for the conduit.

Where these installations will be made on structures with steel superstructures, the weight of the structural steel members used to support the conduits, exclusive of hanger rods, rollers, etc., shall be included in the item for Structural Steel and paid for by the pound.

Where these conduit installations will be made on structures with concrete superstructures, the cost of the structural steel members used to support the conduits and their associated hardware shall be included in the linear foot unit price bid for the conduit.

Where pipelines and casings are involved, prices based on standard estimating guides, such as the "Dodge Estimating Guide for Public Works Construction" or some other basis, approved by the Authority, should be used by the Engineer for estimating or checking betterment costs.

#### **7.2.8.4 Utility Service to Authority Facilities**

Utility Service to Authority Facilities shall be arranged by the Engineer with the utility owner. The Engineer shall determine service demands and shall meet with the utility owner to establish the responsibilities for the various items of work to be performed, the date the service will be required, and the utility owner's terms for providing service as a requirement for Phase "B". The Engineer shall forward to the Authority any necessary agreement forms, together with a detailed outline of the size and type of required service, the costs, and the detailed individual responsibilities of the Authority and the utility owner. On the basis of this information, the Authority will sign and return agreement forms and if necessary provide a check payable to the order of the utility owner to the Engineer who shall formally request service from the utility owner. Service requests shall be completed by Phase "C".

#### **7.2.8.5 Public Telephone**

Public telephone facilities have been provided at Authority facilities at points convenient to the traveling public. For each project which includes toll plazas, rest areas or other public spaces, the number and locations of public telephones are to be determined by the Engineer in conjunction with Patron Services Department.

If public telephones will be provided, the Engineer will provide, in the Authority's construction contract, for the installation of conduit and appurtenant junction boxes between the existing public telephone lines and the telephone stand or building line. The Authority contract shall also provide for the power cable and conduit for lighting the stand and the power connection to the pre-wired stand, and for the stand foundation slab and concrete walkway serving the stand.



The Telephone Company will furnish and install the telephone, the stand, and the telephone cable. All telephone connections to the telephone and stand will be made by the Telephone Company. All materials furnished and work done by the Telephone Company shall be without cost to the Authority.

The Engineer will make all necessary arrangements with and will obtain all pertinent information from the Telephone Company and shall provide field liaison at the time of construction.

#### **7.2.8.6 Tax Exempt Status**

The Authority is exempt from taxes on materials ordered by utility owners for utility relocations to be made at Authority expense. In order to obtain this exemption, the Engineer shall request utility owners to arrange for shipment in the name of the Authority in care of the Utility owner, thus gaining exemption from the tax.

#### **7.2.8.7 Utility Policies**

The following are the Utility Policies which have been approved by the Authority:

Power: There shall be at least one (1) full size spare conduit installed in addition to the necessary quantity of conduits containing the power cables required by design.

Riser poles are to be located outside the right of way lines. Cables are to be placed underground between structures.

Telephone: For the first cable, provide two (2) ducts. Provide one (1) duct for each additional cable.

The power and telephone ducts in structures are to be furnished and installed by the Authority's contractor.

## APPENDIX A - GENERAL REQUIREMENTS FOR UTILITY INSTALLATIONS

### I. **INTRODUCTION:**

When utilities cannot be installed by cut and cover construction, trenchless technologies shall be considered and designed in accordance with the procedures described below. Due to the impact to pavement performance, presence of other utilities, and traffic impact, cut and cover construction methods will not be allowed for utility installations below any NJTA roadway or facility without written approval from the Authority.

#### Definitions:

- A. **Auger Boring (AB)** A technique where a horizontal bore hole is created from a drive shaft to a reception shaft by means of a rotating cutting head. Spoils are transported back to the drive shaft by helical-wound auger flights rotating inside a steel casing that is being jacked in place simultaneously. AB may provide limited tracking and steering capability. It does not provide continuous support to the excavation face. AB is typically a 2-stage process (i.e., casing installation and carrier pipe installation).
- B. **Pipe Jacking (PJ)** A pipe is jacked horizontally through the ground from the drive shaft to the reception shaft. The excavation can be accomplished manually or mechanically.
- C. **Microtunneling (MT)** A remote controlled guided pipe-jacking process that provides continuous support to the excavation face. The guidance system usually consists of a laser mounted in the drive shaft communicating a reference line to a target mounted inside the MT machine's articulated steering head. The MT process provides the ability to better control excavation face stability by applying mechanical or fluid pressure to counterbalance the earth and hydrostatic pressures.
- D. **Horizontal Directional Drilling (HDD)** A multi-stage process that consists of drilling a small diameter pilot hole along a predetermined path. The pilot hole is then developed into a suitable bore hole that will accommodate the desired utility which is ultimately pulled back through the developed alignment. The HDD process provides the ability to track the location of the drill bit and steer it during the drilling process. The vertical profile of the bore hole is in the shape of an arc entrapping drilling fluid to form a slurry pathway rather than an open hole. This entrapped slurry provides continuous support to the bore hole.
- E. **Casing Pipe** or casing is defined as a pipe which is installed for the purpose of stabilizing an excavation.
- F. **Carrier Pipe** is defined as pipe which is installed inside of casing pipe to house the utility.
- G. **Driving Shaft** is an excavation constructed for initiating the advancement of a casing as part of a trenchless technology operation, a.k.a. sending shaft or jacking pit.

- H. **Reception Shaft** is an excavation constructed at the termination point of a trenchless technology operation.
- I. **License to Cross (LTC)** is a legal document that grants permission to outside parties (i.e. utility owners) to impact Turnpike Authority property.

The Authority will only allow trenchless technology methods defined above (Items A through D) to be used under NJTA roadways and facilities. All other alternative methods will not be allowed by the Authority including; slurry boring, pipe ramming, soil compaction, or utility tunneling, as defined in *NCHRP Synthesis 242 Trenchless Installation of Conduits beneath Roadways*.

## II. REQUIREMENTS:

### A. General

1. Design of trenchless utility installations shall conform to current AASHTO LRFD Bridge Design Specifications
2. Design for trenchless methods shall accommodate protection against soil instability and uncontrolled ground water inflow into the driving shaft and/or reception shaft and prevention of soil subsidence/settlement along the alignment with adequate instrumentation/monitoring procedures. In addition, the design shall consider safe shaft ingress and egress where applicable, including but not limited to ladders, stairs, walkways, and hoists, protection against mechanical and hydraulic equipment operations, and for lifting and hoisting equipment and material, ventilation and lighting, monitoring for hazardous gases, protection against flooding and means for emergency evacuation, protection of shafts including traffic barriers, accidental or unauthorized entry, and falling objects, emergency protection equipment and safety supervising responsibilities.
3. Casings shall generally be new welded, threaded, or interlocking connected steel pipe with a minimum wall thickness as per design calculations and shall be shown on the plans included with the LTC application. Other materials may be allowed for specific methods of installation, as described below. It is recommended that the smallest diameter casing viable given a particular installation method, and capable of carrying the utility to be installed, be used. The larger the diameter of casing, the greater the potential for subsidence. If future expansion is planned, a larger casing may be installed to allow for additional / larger carrier pipe to be installed in the future.. In addition, the casing should be capable of accommodating equipment for drilling through obstructions.
4. The horizontal limits of casing for pipelines carrying hazardous material or materials under pressure, shall extend from right of way line to right of way line unless precluded by field conditions and approved by the Authority. Casings for pipelines carrying products other than hazardous materials or materials under pressure may be terminated at the toe of slope or center line of the ditch.
5. With approval from NJTA Engineering, casing pipe may also serve as the carrier pipe depending on the installation method, pipe material, facility use and depth underneath Authority ROW.
6. Carrier Pipe may be composed of the following materials depending on the installation methods as described in the NJTA Supplemental Specification:

- a. High Density Polyethylene (HDPE)
  - b. Polyvinylchloride (PVC)
  - c. Glass Fiber Reinforced Polymer Pipe (GFRP)
  - d. Centrifugally Cast Fiberglass Reinforced Polymer Concrete (CCFRP)
  - e. Steel
  - f. Vitrified Clay Pipe
  - g. Reinforced Concrete Pipe (RCP) Class III
7. A minimum cover of the greater of 6 feet or two casing diameters below the lowest pavement surface shall be provided for all acceptable methods except HDD, which shall require a minimum cover of the greater of 10 feet or five casing diameters.
  8. Ends of casing pipe shall be sealed with a flexible material prior to backfilling to prevent flowing water and debris from entering the annular space between the casing and the carrier pipe.
  9. To ensure voids were not created by the operation, ground penetrating radar is required as described in Standard Supplemental Specification 533. Any voids found to have been created outside of the casing pipe must be filled in accordance with a method approved by the Authority.
  10. The use of bentonite or polymer slurry to lubricate the outside of the casing to reduce driving forces may be allowed contingent upon Authority approval.
  11. Overcut outside of the casing diameter shall not exceed 1 inch. Oversized holes must be backfilled with grout to fill the annulus between the pipe and the surrounding soil.
  12. All pipeline casings shall be furnished with standoffs, which center and adequately support the carrier pipeline within the casing, and with link seals and casing end seals, manufactured especially for this purpose.
  13. Manholes are to be located outside of the Authority right of way.
  14. The utility owner shall place an above ground marker within 5' feet inside the Authority's right of way or fence to indicate the presence of the utility.
  15. After trenchless installation begins, the operation must proceed continuously until complete.
  16. Driving and receiving shafts shall conform to the following requirements:
    - The shaft shall not be located within 10 feet of the outer edge of the paved shoulder.
    - When located between 10 to 30 feet from the outer edge of the paved shoulder, the shaft shall be constructed with steel sheeting.
    - When located beyond 30 feet from the outer edge of the paved shoulder, the shaft shall be constructed with steel or timber sheeting for the closest face to the roadway, with the option of the remaining sides being unsheeted.
    - The exit and entrance face of all driving or receiving shafts must be sheeted, regardless of the distance from the outer edge of the paved roadway.

- Unsheeted shaft sides are only permitted provided a 1 to 1 slope can be maintained and the excavation in other respects complies with OSHA regulations.
- Steel sheeting may be extracted upon backfilling the excavation except the front line closest to the roadway which shall be left in place and cut off 2 feet below grade.
- Timber sheeting shall be tongue-and-groove and cut off 2 feet below finished grade.
- Excavated materials shall be placed outside of the clear zone and surplus and waste materials shall be disposed of off Authority right of way.
- When the driving or receiving shaft is located between 10 and 30 feet from the outer edge of paved shoulder, a standard shoulder closing shall be installed as per the Authority's Manual for Traffic Control in Work Zones.
- If there is existing guide rail, concrete construction barrier is not required.
- Driving and receiving shafts in the median area shall not be permitted, unless 10 feet of clearance to the edge of pavement is available. All driving or receiving shafts in the median shall be constructed using steel sheetpiles.
- All work areas must be enclosed with 4-foot high fencing.

#### **B. Cut and Cover**

Cut and cover construction methods for utility installations crossing NJTA roadways and facilities will only be allowed if approved by the Authority. The use of cut and cover will be considered if special circumstances exist, for example if the existing pavement box will be replaced in the near future or if the roadway will be taken out of service for other reasons. Cut and cover installations will be allowed below spans between foundations, but will require the assessment and mitigation of any impact to adjacent foundations.

Trenches shall be excavated in accordance with NJTA Specifications Section 206. Fill material shall be Embankment Grade A as described by NJTA Standard Specification 901. Compaction criteria shall be as described in NJTA Standard Specification 203. If the designer requires more stringent criteria, it may be specified on the plans submitted with the LTC application.

#### **C. Auger Boring**

Casing material shall be steel. Thickness, section length, connection details, and grade of steel shall be specified on the plans included with the LTC application, and must satisfy the minimum requirements provided here and in the NJTA Standard Supplemental Specification 533. The Authority will generally not consider less than 4 inch diameter or greater than 60 inch diameter casings installed with this method, but may consider other diameters on an individual basis. The Authority will generally not consider this method feasible for installation lengths greater than 300 feet.

Although tracking and steering capabilities are limited, the equipment shall include any tracking and steering capabilities available for this method. The tolerances of these capabilities will be determined on a project specific basis and indicated on the plans included with the LTC application. The auger shall remain a minimum of 1 casing diameter behind the casing face, or as necessary to maintain a stable face. The leading edge of the casing shall also be reinforced with a surrounding band, which shall be detailed in the LTC application plans. Standard Supplemental Specifications Section 533 Installing Utilities with Trenchless Technologies, provides

a minimum standard for monitoring excessive settlement. As the designer deems necessary, a more stringent monitoring program can be specified on the LTC application plans.

**D. Pipe Jacking**

The Authority will generally consider the following materials acceptable for casing: steel, reinforced concrete pipe (RCP), glass-fiber reinforced pipe (GFRP), or polymer concrete pipe (PCP). Thickness, section length, connection details, and material properties shall be specified on plans submitted with the LTC application, but must satisfy the minimum requirements provided here and in the NJTA Standard Supplemental Specification 533. For this method, the Authority will generally allow these types of pipe for diameters between 36 inches and 72 inches, but may consider other diameters on an individual basis.

Intermediate jacking stations will be allowed below the Authority roadways. The proposed length shall be verified to ensure the equipment and methods proposed are capable of exerting enough thrust. Excavation shall remain a minimum of 1 casing diameter behind the casing face, or as necessary to maintain a stable face.

**E. Microtunneling**

The Authority will generally consider the following materials acceptable for casing; steel, RCP, or GFRP. Thickness, section length, connection details, and material properties shall be specified on the LTC application plans, but must satisfy the minimum requirements provided here and in NJTA Standard Supplemental Specification 533. For this method the Authority will generally allow these types of pipe for diameters between 24 inches and 48 inches, but may consider other diameters on an individual basis.

Intermediate jacking stations will be allowed below the Authority roadways. The proposed length shall be verified to ensure the equipment and methods proposed are capable of exerting enough thrust. The shield shall remain at the face for the entire microtunneling operation.

**F. Horizontal Directional Drilling**

The Authority will generally consider the following materials acceptable for casing; steel, polyvinyl chloride PVC, or HDPE. Thickness, section length, connection details, and material properties shall be specified on LTC application plans, but must satisfy the minimum requirements provided here and in Standard Supplemental Specification 533. For this method the Authority will generally allow these types of pipe for diameters between 3 inches and 48 inches, but may consider other diameters on an individual basis.

Standard Supplemental Specifications Section 533 Installing Utilities with Trenchless Technologies provides a minimum standard for monitoring excessive settlement. This method may require the Engineer to require a more stringent Instrumentation program. In addition, this specification provides minimum standard limitations on fluid pressures, which can be modified by the Engineer. Tracking and steering shall be provided with this method.

**III. SUBMITTALS:**

For new underground utilities to be installed using trenchless technology methods, the following information shall be required by the Authority for inclusion in the LTC application submission:

1. Calculations including, but not limited to:
  - a. Soil boring logs
  - b. Subsurface profile
  - c. Laboratory test results
  - d. Determination of loads on the proposed utility at Service Load Combination I (Reference 2, Article 12.5.2, Table 3.4.1-1, and Article 12.6, Article 3.6.2.2). Also consider hydraulic uplift and jacking or driving forces.
  - e. Corrosion potential or abrasion loss of pipe (Reference 1, Article 12.6.9)
  - f. Adequacy of proposed pipe section and material for shear, buckling, seam resistance, etc.
  - g. Scour potential (Reference 1, Article 12.6.5)
  - h. Deflection shall be accounted for when checking clearances
  - i. Geotechnical bearing resistance and settlement of pipe
  - j. Dewatering or ground improvement if necessary
  - k. Drilling fluid will not enter pavement box
  - l. Impact of vibration to existing foundations or utilities
  - m. Anticipated heave or subsidence and mitigation proposed if necessary.
  - n. Design of any walls required to provide thrust for the pipe or to stabilize an excavation. This shall include, but not be limited to, checking for sliding or lateral resistance if deep foundations are required, overturning, global stability, bearing capacity or axial resistance if deep foundations are required, uplift, amount and rate of settlement, and structural resistances. These tasks shall be performed in accordance with AASHTO (Reference 2).
2. Utility plans, in conformance with the plan requirements as specified on the Authority's website for LTC applications, shall include, but may not be limited to:
  - a. Plan sheets showing:
    - i. Proposed utility location and dimensions (length, wall thickness, and diameter)
    - ii. Driving and receiving shafts locations and dimensions
    - iii. Boring locations
    - iv. Right-of-way lines
    - v. Existing utilities
    - vi. Existing features, such as buildings, roadway, barrier, structures, etc.
    - vii. Instrumentation plans and monitoring requirements
  - b. Profile sheets along the proposed utility alignment showing:
    - i. Soil or rock conditions
    - ii. Groundwater conditions
    - iii. Existing and proposed utilities
    - iv. Existing and proposed foundations
    - v. Driving and receiving shafts
    - vi. Existing and proposed ground lines
    - vii. Limits of pavement box (i.e. Asphalt, DGA, Grade A Embankment, Common Embankment)
  - c. Three cross sections perpendicular to the alignment showing the same information as listed above for the utility profile if six or more borings were taken at the site. No cross sections will be required if the site is considered to have low variability based on existing data
  - d. Any incidental, environmental, drainage, staging, or structural plans as necessary.

3. Standard Supplemental Specifications Section 533, Installing Utilities with Trenchless Technologies, modified as necessary to accommodate the site conditions and project constraints, shall also be required. This document includes the requirements of the Site Specific Work Plan (SSWP).

**REFERENCES:**

1. AASHTO. *LRFD Bridge Design Specifications*. Fifth Ed. 2010
2. AASHTO. *Technical Manual for Design and Construction of Road Tunnels – Civil Elements*. September 2010 Ed.
3. New York State Department of Transportation. *Design Guidance for Trenchless Installations of Casing*. 2007.
4. Transportation Research Board National Research Council. *NCHRP Synthesis 242 Trenchless Installation of Conduits Beneath Roadways*. 1997.